

FCC PART 95
EMI MEASUREMENT AND TEST REPORT

For

Kids Station Toys International Ltd.

**Room 804, 8/F, Empire Centre, 68 Mody Road, Tsimshatsui East,
Kowloon, Hong Kong**

FCC ID: R55KSS9104
Model: KSS9104

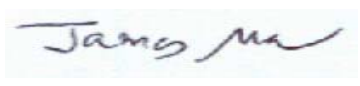
This Report Concerns: <input checked="" type="checkbox"/> Original Report	Product Type: Two Way FRS Radio
Test Engineer: Daniel Deng	
Report Number: R0604287	
Report Date: 2006-05-15	
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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Kids Station Toys International Ltd.* 's product, FCC ID: *R55KSS9104*, Model: *KSS9104* or the "EUT" as referred to in this report is a FRS two-way radio with an integral antenna, which measures approximately 9.1cmL x 5.8cmW x 3.7cmH .

The EUT operates in the frequency range of 462.5625 –467.7125 MHz, with a maximum output power of 0.063W, frequency tolerance of 0.00002% and emissions designator 4K42F3E.

** The test data gathered are from production sample, serial number: #1, provided by the manufacturer.*

EUT Photo



Additional photos in Exhibit B

Objective

This report is prepared on behalf of *Kids Station Toys International Ltd.* in accordance with Part 95 Subpart E of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for effective radiated power, modulation characteristics, occupied bandwidth, spurious emissions, and frequency stability.

Related Grant/Submission

No Related Submittals.

Test Methodology

Measurements contained in this report were also conducted with TIA/EIA 603-C, Telecommunications Industry Association Land Mobile PM Communications Equipment Measurement and Performance Standards.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratory Corporation to collect radiated and conducted emissions measurement data is located at it's facility in Sunnyvale, California, USA.

Test site at Bay Area Compliance Laboratory Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules and Article 8 of the VCCI regulations. The facility also complies with the test methods and procedures set forth in ANSI C63.4-2003.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations is attached hereinafter and can also be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm>

SYSTEM TEST CONFIGURATION

Justification

The EUT was tested according to TIA/EIA _603-C to represent the worst-case results during the final qualification test.

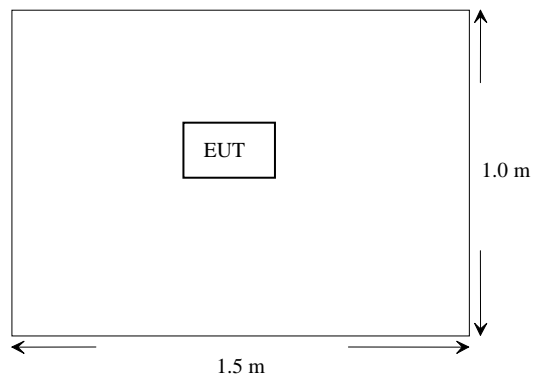
Special Accessories

N/A

Equipment Modifications

No modifications were made to the EUT.

Test Setup Block Diagram



REQUIREMENTS OF PROVISIONS

Results reported relate only to the product tested, serial number: #1.

FCC Rules	Rules Description	Requirement	Result
2.1046 95.639 (d)	Output Power	0.5 W (ERP)	Complied
2.1047 95.637 (a)	Modulation Characteristics Audio Frequency Response	< +/- 2.5KHz < 3.125KHz	Complied
2.1049 95.633 (c)	Authorized Bandwidth	12.5 KHz	Complied
§2.1053 §95.635(b)(1) §95.635(b)(3) §95.635(b)(7)	Unwanted radiation	25 dB (50% BW to 100% BW) 35dB (100%BW to 250% BW) 43+10log(T) dB (above 205% BW)	Complied*
2.1053 (a) §95.635(b)(1) §95.635(b)(3) §95.635(b)(7)	Spurious Emissions at Antenna Port	25 dB (50% BW to 100% BW) 35dB (100%BW to 250% BW) 43+10log(T) dB (above 205% BW)	Complied
2.1055 95.627 (b)	Frequency Stability Vs. Temperature Vs. Voltage	Within 0.00025%	Complied

**Within the measurement uncertainty*

§2.1046 and § 95.639 (d) – Output Power

Applicable Standard

Per FCC §2.1046 and FCC § 95.639 (d), No FRS unit, under any condition of modulation, shall exceed 0.500 W effective radiated power (ERP).

Test Procedure

- 1) Radiated Power output: TIA-603-C section 2.2.17;
- 2) Conducted Power output: TIA-603-C section 2.2.1

Test Equipment

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Sensor, Power	E4412A	US38488542	2005-09-08
Agilent	Meter, Power	E4419B	MY4121511	2005-08-31
HP	Analyzer, Spectrum	8565EC	3946A00131	2006-01-11

* **Statement of Traceability: BACL Corp.** certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	75%
ATM Pressure:	1021 mbar

The testing was performed by Daniel Deng on 2006-05-08.

Test Results:

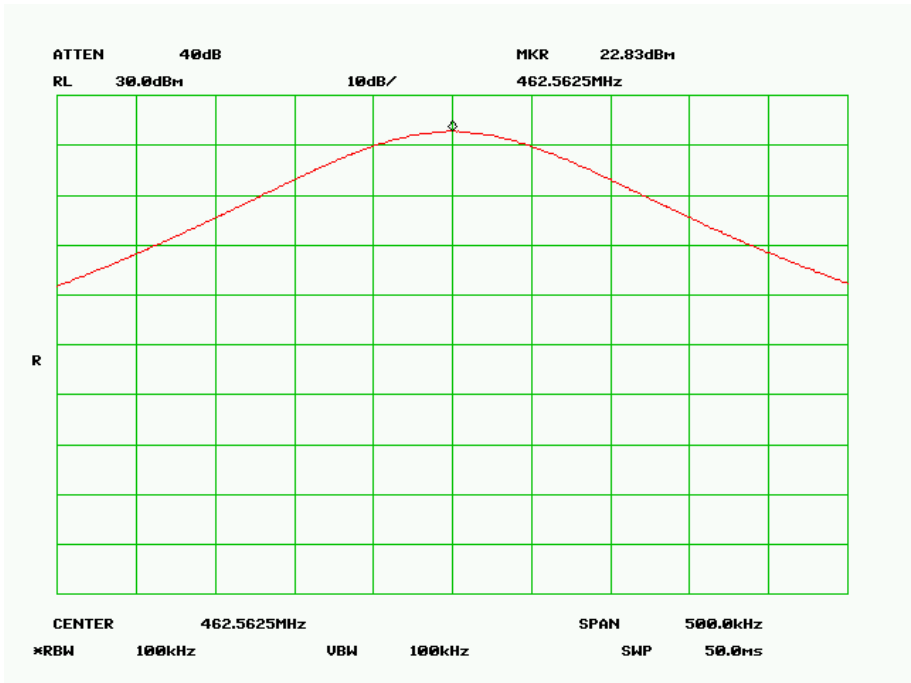
ERP:

Frequency (MHz)	Output power (W)	Limit (W)
462.5625	0.051	0.5
462.7125	0.063	0.5
467.7125	0.059	0.5

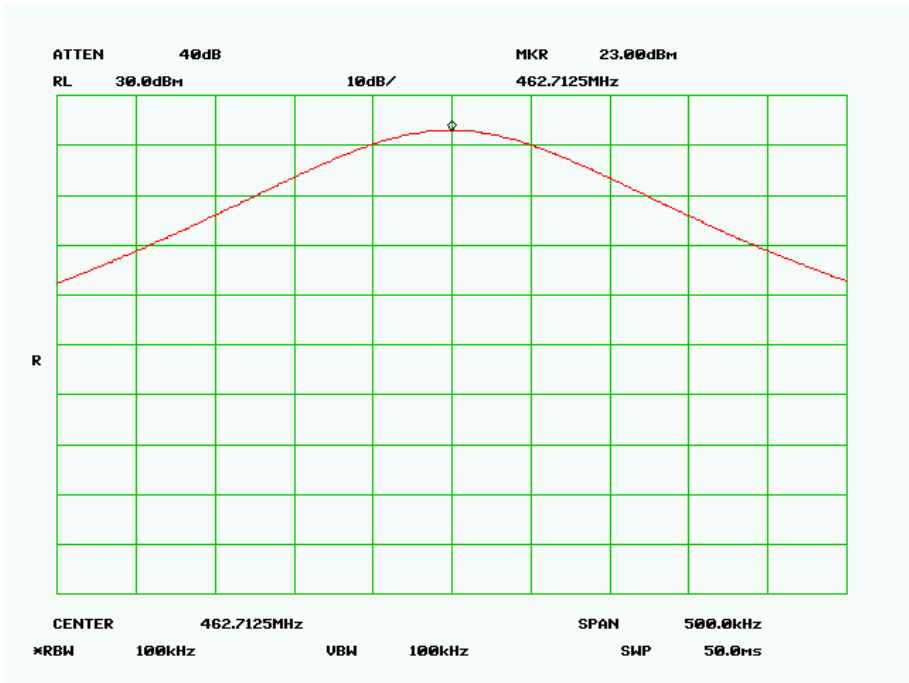
Conducted output power:

Please refer to the following plots.

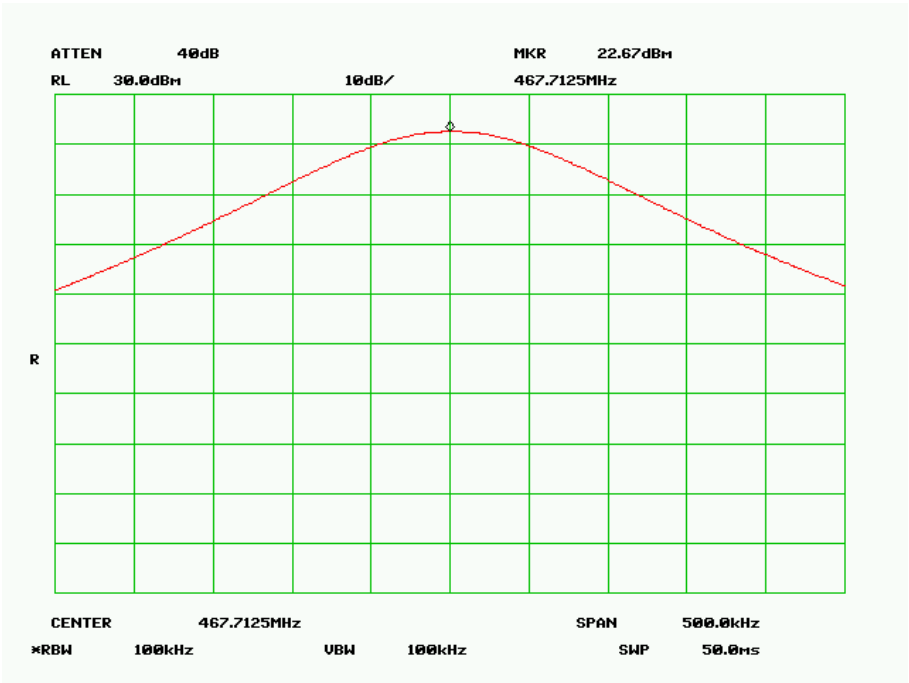
Channel 1



Channel 7



Channel 14



§2.1047, § 95.637(a) – Modulation Characteristics

Applicable Standard

Per FCC § 2.1047, §95.637 (a), A FRS unit that transmits emissions type F3E must not exceed a peak frequency deviation of plus or minus 2.5 kHz, and the audio frequency response must not exceed 3.125 kHz .

Test Procedure

TIA-603-C

Audio Frequency Response

The RF output of the transceiver was connected to the input of an AM modulation analyzer through sufficient attenuation so as not to overload the meter or distort the reading. An audio signal generator was coupled into the external microphone jack of the transceiver.

The audio signal input level was adjusted to obtain 50% of modulation at 1 kHz, and recorded as AM_{ref}. With the audio signal generator level unchanged, set the generator frequency between 100 Hz to 5000 Hz. The transmitter modulation (AM_{freq}) were measured and the audio frequency response was calculated as

$$20\log_{10} [AM_{FREQ} / AM_{REF}]$$

Audio Low-Pass Filter Response

An audio signal generator and an audio spectrum analyzer were connected to the input and output of the post limiter low pass filter respectively. The audio signal generator frequency was set between 1000 Hz and the upper low pass filter limit. The audio frequency response at test frequency was calculated as

$$LEV_{FREQ} - LEV_{REF}$$

Modulation Limiting

With the same setup as the above, at three different modulating frequencies, the output level of the audio generator was varied and the AM in % was recorded.

Test Equipment

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Analyzer, Spectrum	8565EC	3946A00131	2006-01-11
HP	Analyzer, Modulation	8901A	2026A00847	2006-01-17
Agilent	Generator, Function	33220A	MY43004878	2005-05-18
HP	Spectrum Analyzer	3585A	1750A02012	2005-07-19

* **Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

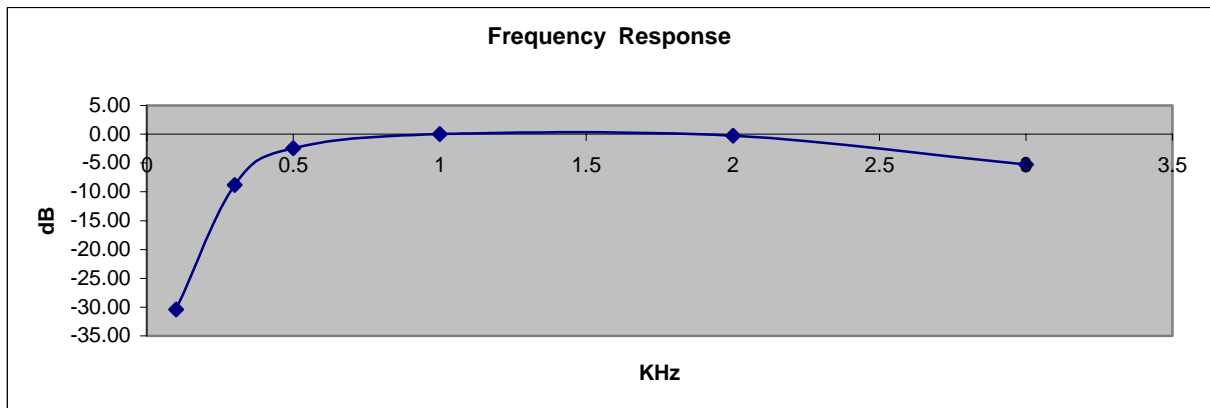
Temperature:	20 ⁰ C
Relative Humidity:	72%
ATM Pressure:	1018 mbar

The testing was performed by Daniel Deng on 2006-05-08.

Test Results

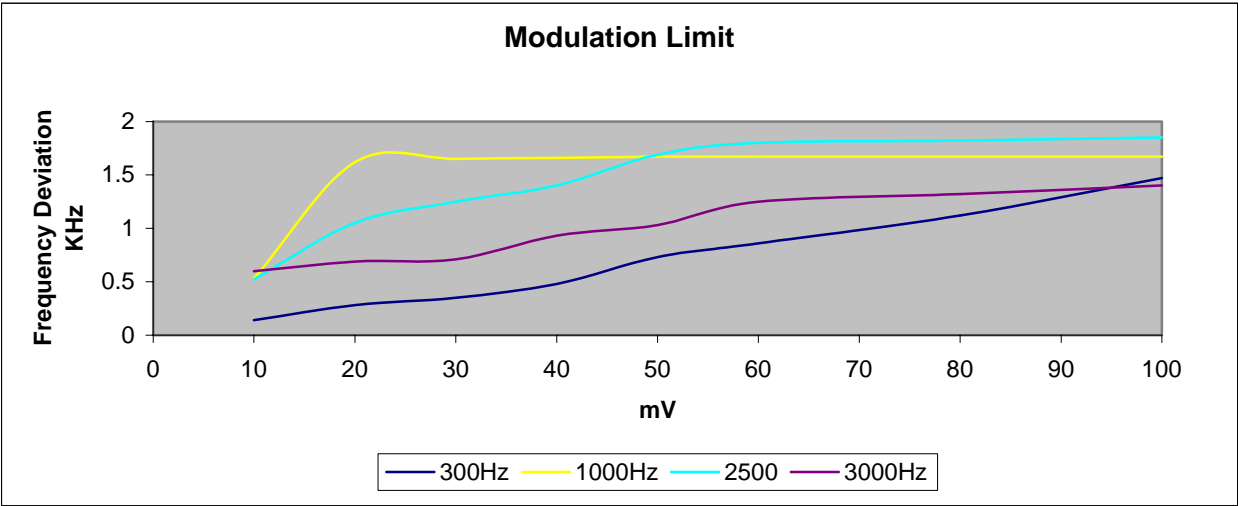
The plot(s) of modulation characteristic is presented hereinafter as reference.

Freq (KHz)	Deviation KHz	Freq Response (dB)
0.1	0.01	-30.37
0.3	0.12	-8.79
0.5	0.25	-2.41
1	0.33	0.00
2	0.32	-0.27
3	0.18	-5.26



Modulation Limit

Input Audio Level (mV)	300Hz	1000Hz	2500Hz	3000Hz
10	0.14	0.53	0.52	0.6
20	0.28	1.62	1.05	0.69
30	0.35	1.65	1.25	0.71
40	0.48	1.66	1.4	0.93
50	0.73	1.67	1.69	1.03
60	0.86	1.67	1.8	1.25
80	1.12	1.67	1.82	1.32
100	1.47	1.67	1.85	1.4



§2.1049 and § 95.633(c) - Authorized Bandwidth of Emissions

Applicable Standard

Per FCC §2.1049 and FCC §95.633 (c), The authorized bandwidth for emissions type F3E or F2D transmitted by a FRS unit is 12.5 kHz.

Test Procedure

The antenna was disconnected from the transmitter and the short cable was connected to the transmitter RF output.

The RF output was connected to the input of the spectrum analyzer through sufficient attenuation.

With the transmitter keyed, the level of the unmodulated carrier was set to the full scale reference line of the spectrum analyzer. This is used as a 0dB reference for emissions mask measurements.

The transmitter was then modulated with a 2500 Hz tone at an input level 16 dB greater than the necessary to produce 50% modulation. The resolution bandwidth of the spectrum analyzer was set up to 300 Hz and the spectrum of the transmitting signal was recorded. This spectrum was compared to the required emissions mask.

Test Equipment

Manufacturer	Description	Model	Serial Number	Cal. Due Date
HP	Analyzer, Spectrum	8565EC	3946A00131	2006-01-11

* **Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

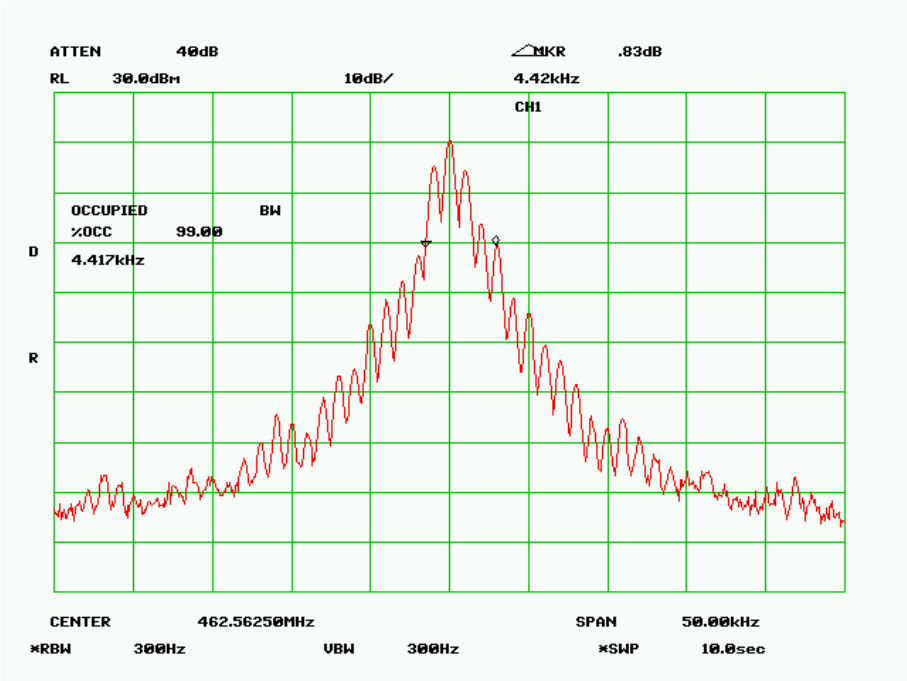
Temperature:	20 ⁰ C
Relative Humidity:	72%
ATM Pressure:	1018 mbar

The testing was performed by Daniel Deng on 2006-05-08.

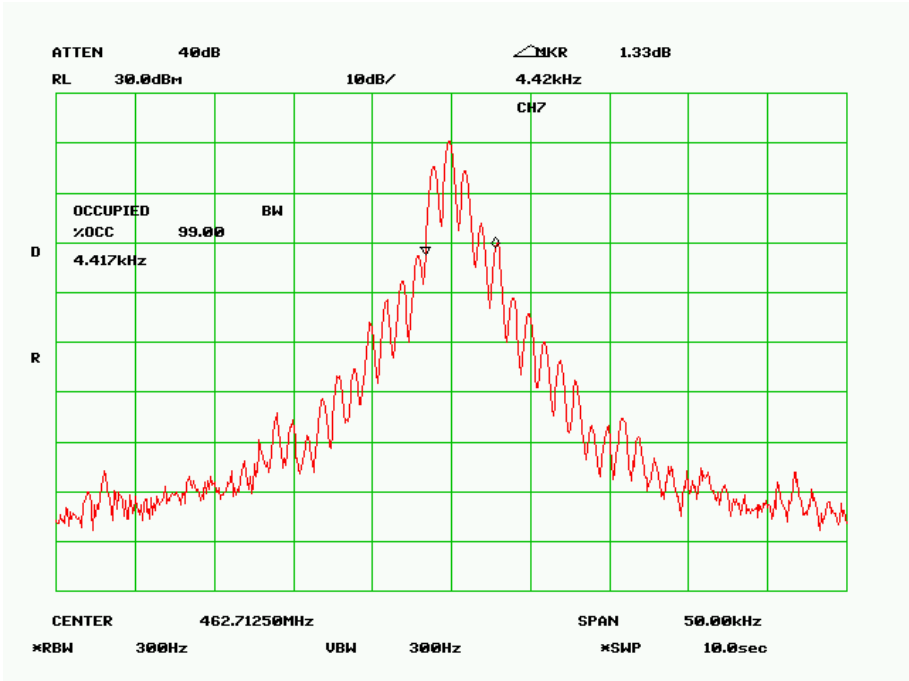
Test Results

Please refer the following plots.

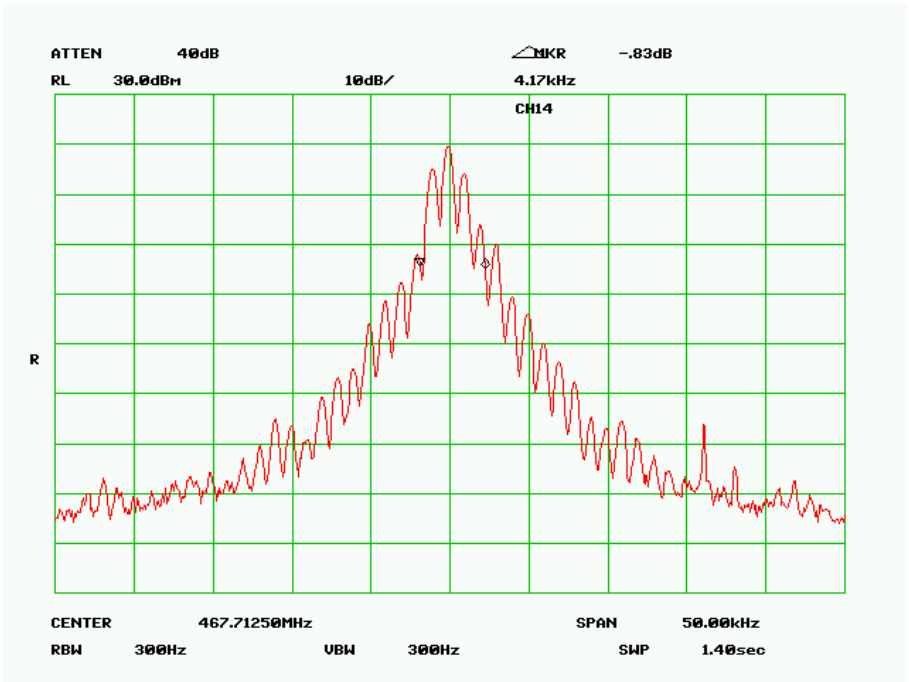
Channel 1



Channel 7



Channel 14



§2.1053, §95.635(b) Unwanted Radiation

Applicable Standard

According to FCC §2.1053, measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediated circuit elements under normal condition of installation and operation. Information submitted shall include the relative radiated power of spurious emissions with reference to the rated power output of the transmitter, assuming all emissions are radiated from a half-wave dipole antenna.

According to FCC §95.635(b)(1), at least 25 dB (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.

According to FCC §95.635(b)(3), at least 35 dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth.

According to FCC §95.635(b)(7), at least $43 + 10 \log_{10}(T)$ dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Test Equipment

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2006-03-06
Rohde & Schwarz	Generator, Signal	SMIQ03	849192/0085	2005-05-02
Sonoma Instrument	Amplifier, Broadband	317	260408	2006-02-03
HP	Amplifier, Pre, Microwave	8449B	3147A00400	2005-08-10
HP	Generator, Signal	83650B	3614A00276	2005-05-10
A.R.A.	Antenna, Horn	DRG-118/A	1132	2005-08-17
Sunol Sciences	Antenna	JB3	A020106-3 / S006628	2006-03-14
HP	Analyzer, Spectrum	8565EC	3946A00131	2006-01-11

* **Statement of Traceability:** BACL Corp. certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	72%
ATM Pressure:	1018 mbar

The testing was performed by Daniel Deng on 2006-05-08.

Test Result

Radiated Worst Case readings:

-3.2 dB at 1387.6875 MHz in the Vertical polarization

Primary scan at Low Frequency 462.5625MHz (CH1) for FRS.

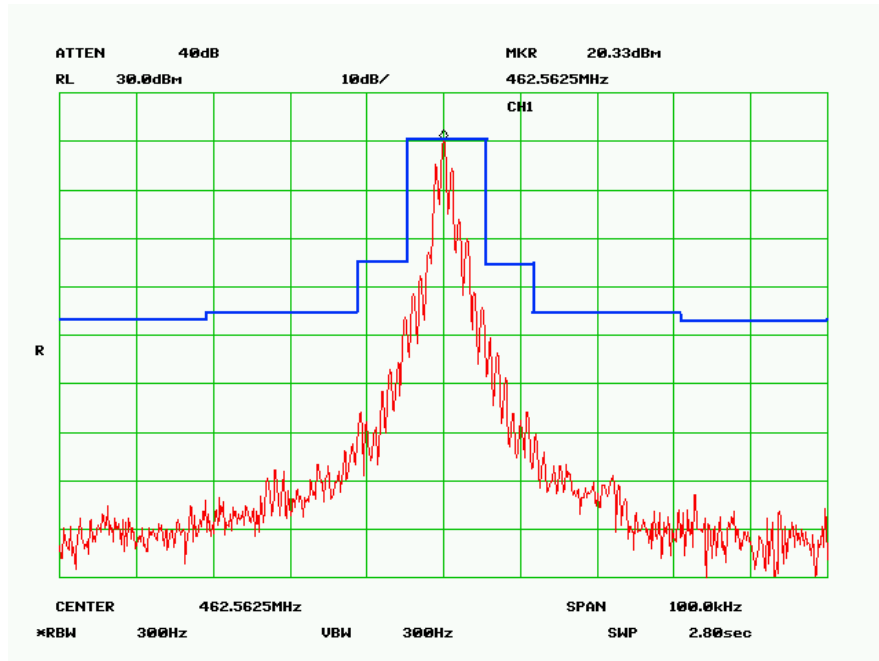
Indicated		Table	Test Antenna		Substituted		Antenna Gain dB	Cable Loss dB	Absolute Level dBm	Limit dBm	Margin dB
Frequency MHz	Ampl. dBuV/m	Azimuth Degrees	Height m	Polar H/V	Frequency MHz	Level dBm					
1387.6875	49.72	103	1.00	V	1387.6875	-22.3	7.4	1.3	-16.2	-13	-3.2*
1850.2500	35.40	140	1.42	H	1850.25	-27.9	9.2	1.6	-20.3	-13	-7.3
1850.2500	34.10	125	1.10	V	1850.25	-28.5	9.2	1.6	-20.9	-13	-7.9
2312.8100	35.20	140	1.23	H	2312.81	-29.8	9.9	1.9	-21.8	-13	-8.8
925.1290	44.80	100	1.00	V	925.125	-21.1	0	0.8	-21.9	-13	-8.9
2312.8100	33.50	107	1.57	V	2312.81	-31.5	9.9	1.9	-23.5	-13	-10.5
925.1250	41.60	250	1.60	H	925.125	-24.5	0	0.8	-25.3	-13	-12.3
1387.6875	40.10	90	1.56	H	1387.6875	-31.9	7.4	1.3	-25.8	-13	-12.8
2775.4000	28.90	135	1.60	V	2775.4	-35	10.5	2.1	-26.6	-13	-13.6
2775.4000	27.70	90	1.27	H	2775.4	-36.4	10.5	2.1	-28.0	-13	-15.0

Note: No preamplifier used.

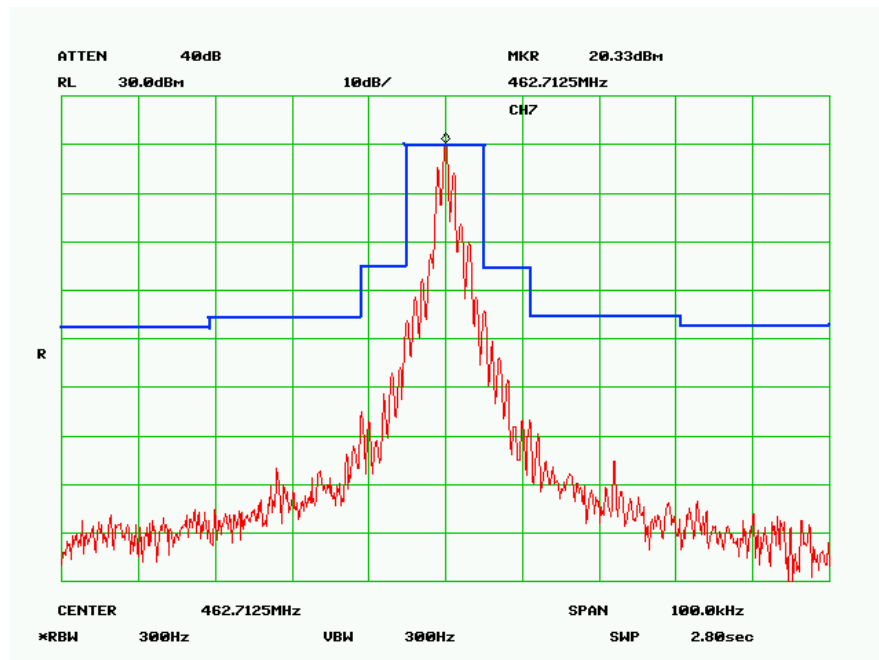
**Within the measurement uncertainty*

Emissions mask:

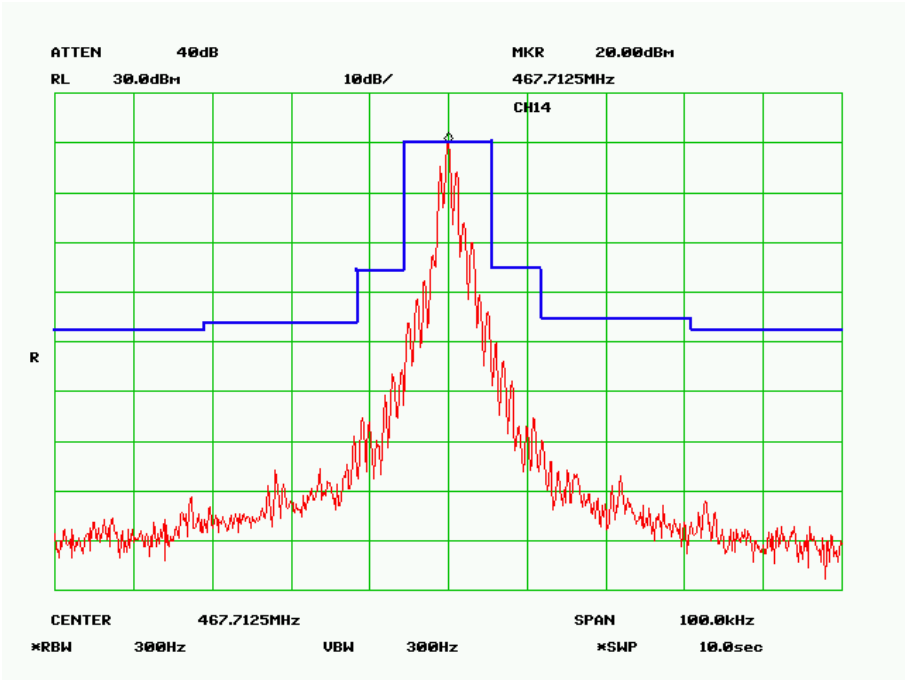
Channel1:



Channel 7:



Channel 14:



§2.1053 §95.635(b)- Spurious Emissions At Antenna Port

Applicable Standard

According to FCC §95.635(b)(1), at least 25 dB (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.

According to FCC §95.635(b)(3), at least 35 dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth.

According to FCC §95.635(b)(7), at least $43 + 10 \log_{10}(T)$ dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

Measurement Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the SA on Max-Hold Mode, and then keep the EUT in transmitting mode. Record all the signals from each channel until each one has been recorded.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

Test Equipment

Manufacturer	Description	Model No.	Serial No.	Calibration Date
HP	Analyzer, Spectrum	8565EC	3946A00131	2006-01-11

* **Statement of Traceability:** **BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

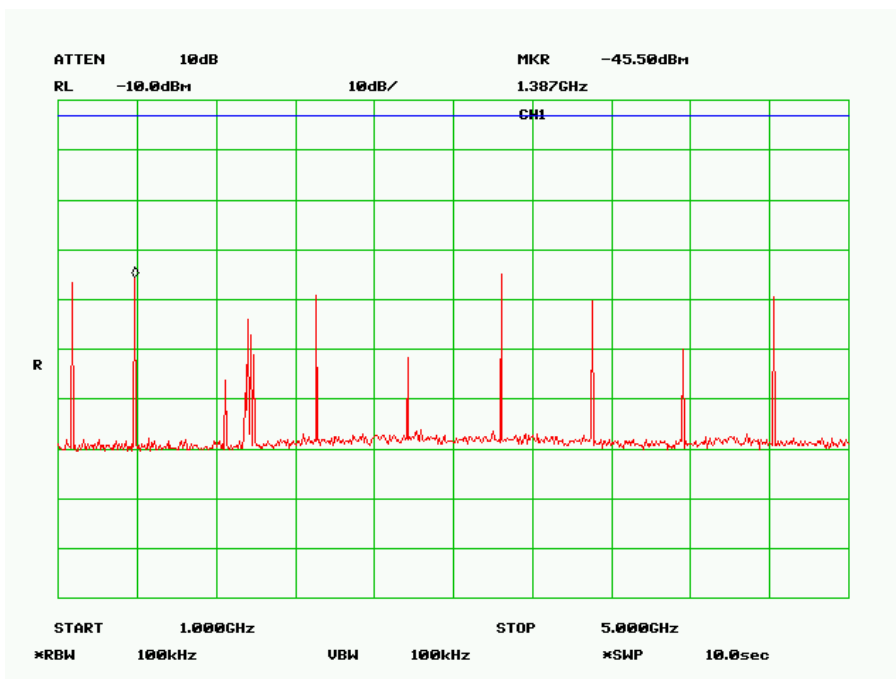
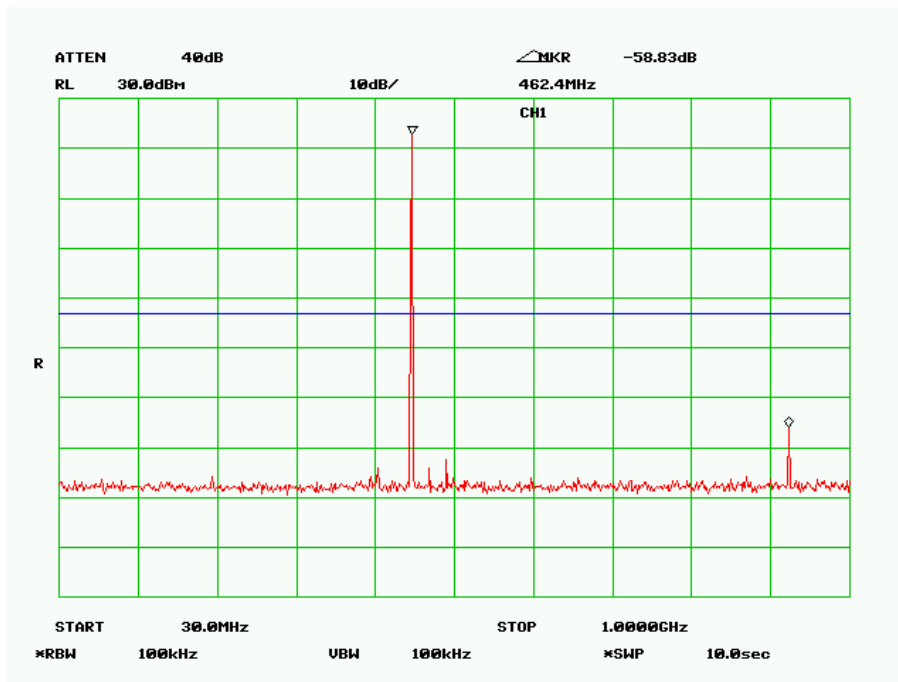
Temperature:	22 ⁰ C
Relative Humidity:	75%
ATM Pressure:	1021mbar

The testing was performed by Daniel Deng on 2006-05-08.

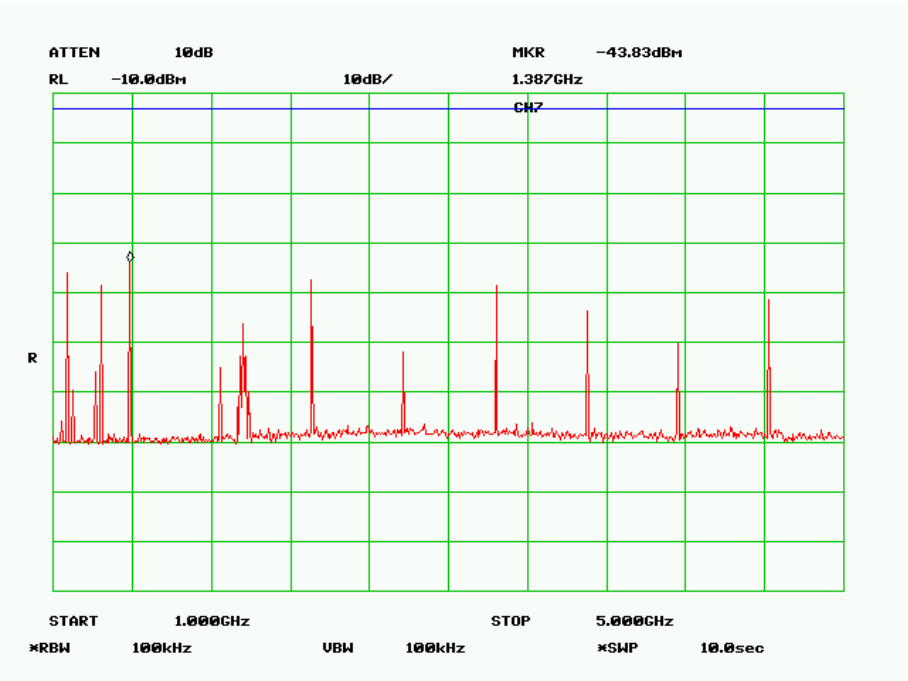
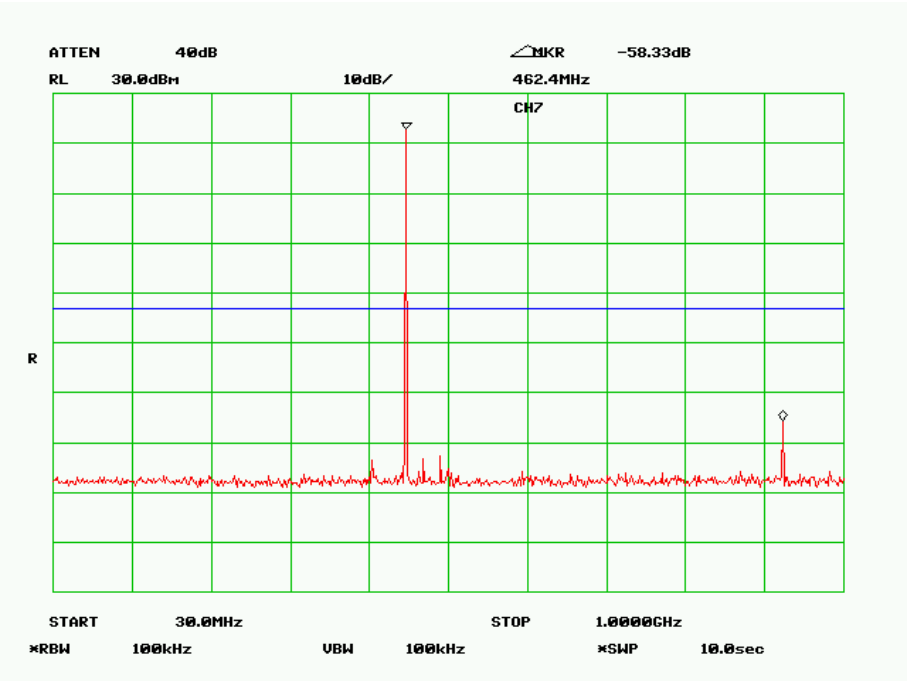
Test Result

Please refer to the following plot(s).

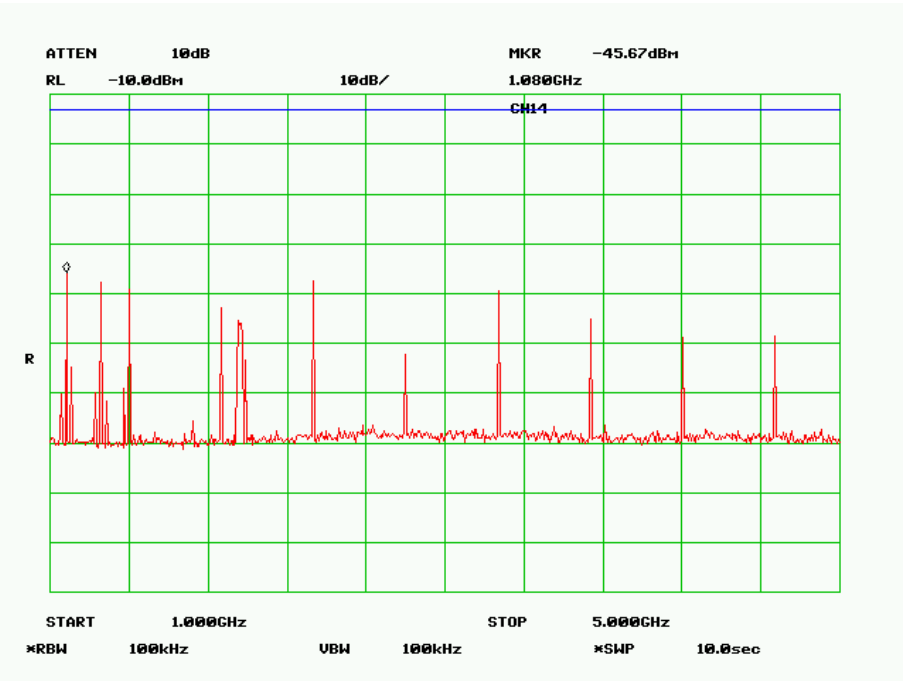
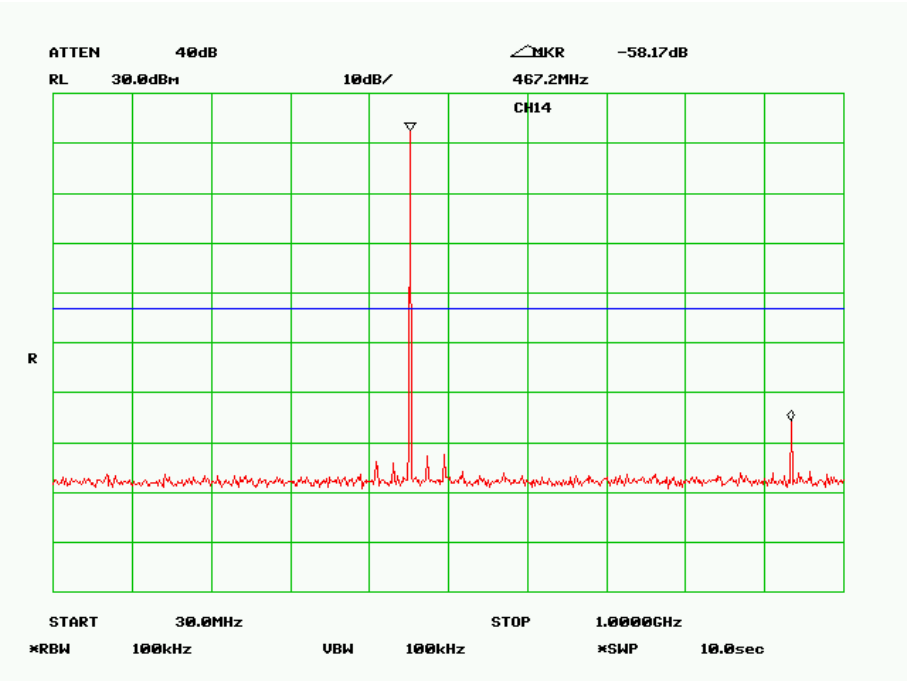
Channel 1



Channel 7



Channel 14



§2.1055 and §95.627(b) – Frequency Stability Measurement

Applicable Standard

According to FCC §2.1055(a)(1), the frequency stability shall be measure with variation of ambient temperature from -30°C to $+50^{\circ}\text{C}$, and according to FCC 2.1055(d)(2), the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point which is specified by the manufacturer.

According to FCC §95.627 (b), each FRS transmitter must be maintained within a frequency tolerance of 0.00025%.

Test Procedure

Frequency stability versus environmental temperature

The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber.

After the temperature stabilized for approximately 20 minutes, the frequency of the output signal was recorded from the counter.

Frequency Stability versus Input Voltage

At room temperature ($25\pm 5^{\circ}\text{C}$), an external variable DC power supply was connected to the EUT. The frequency of the transmitter was measured for 115%, 100% and 85% of the nominal operating input voltage.

Test Equipment

Manufacturer	Description	Model No.	Serial No.	Calibration Date
HP	Analyzer, Spectrum	8565EC	3946A00131	2006-01-11
Tenney	Oven, Temperature	VersaTenn	12.222-193	2005-06-27

* **Statement of Traceability:** **BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	22 ⁰ C
Relative Humidity:	75%
ATM Pressure:	1021mbar

The testing was performed by Daniel Deng on 2006-05-08

Test Results

Extreme Temperature

Temperature	Spec Freq (MHz)	Measured Freq (MHz)	Freq error %	Limit (%)
-30	462.5625	462.562579	0.000017	0.00025
-20	462.5625	462.562565	0.000014	0.00025
-10	462.5625	462.562559	0.000013	0.00025
0	462.5625	462.562537	0.000008	0.00025
10	462.5625	462.562546	0.000010	0.00025
20	462.5625	462.562512	0.000003	0.00025
30	462.5625	462.562533	0.000007	0.00025
40	462.5625	462.562545	0.000010	0.00025
50	462.5625	462.56259	0.000019	0.00025

Extreme Low Voltage (3.5V)

Time	Spec Freq (MHz)	Measured Freq (Hz)	Freq error %	Limit (%)
2	462.5625	462.562538	0.000008	0.00025
5	462.5625	462.562545	0.000010	0.00025
10	462.5625	462.562551	0.000011	0.00025